

## REMARKS

Reconsideration of this application is respectfully requested in light of the amendments above and the remarks contained herein.

## STATUS OF CLAIMS AND SUPPORT FOR AMENDMENTS

Upon entry of this amendment, claims 1-5 and 8-15 will be pending in this application. Claims 6 and 7 have been canceled without prejudice to, or disclaimer of, their subject matter.

Applicant has made clarifying amendments to the claims in order to increase their readability. These amendments are not intended to narrow the scope of the claims, and are supported by the specification and claims as originally filed. Accordingly, the amendments place this application into condition for allowance, or into better form for appeal, and should be entered on that basis under 37 C.F.R. § 1.116.

## ANTICIPATION REJECTION

In the Office action dated January 6, 2009, the Office has rejected claims 1, 5, 8-9 and 14-15 under 35 U.S.C. § 102(b) as anticipated by U.S. Reissue Patent No. 36,118 (Cupertino et al.). Applicant respectfully traverses this rejection for the reasons given below.

The Office action states:

US '118 is applied to the claims 1, 5, 8-9, and 14-15 for the same reason as stated in the previous rejection dated 6/16/2008.

Office action dated January 6, 2009 at page 2. The date is apparently erroneous, since the mailing date of the Office action to which the Office apparently refers is June 25, 2008.

The June 25, 2008 Office action states:

Regarding claim 1, US '118 teaches a method for separating a metal selected from the group of magnesium, copper, titanium, iron, zinc from an organic complex thereof (Col. 1, lines 8-10 of US '118). US '118 teaches applying a chelating ring resin to extract the metal from the aqueous solution in the form of a complex of the metal and the extractant (Col. 1, lines 11-19 and examples 3-6 of US '118), which reads on the method of removal [of] impurities by contact [of] an aqueous [solution] with a chelating ion-exchange resin and removing the metal impurities from said solution using said chelating ion-exchange resin. US '118 teaches applying strong chloride solution on the Cu-included aqueous solution (Col. 5, lines 5-11, and Example 4 of US '118). Though US '118 does not specify copper in monovalent [form], because the copper solution reacts with strong chloride solution, the monovalent copper as recited in the instant claim would have been inherently present in the aqueous solution of US '118. MPEP 2112 III & IV.

Office action dated June 25, 2008 at page 3 (emphasis added).

Applicant respectfully submits that this rationale contains numerous factual and legal errors, and that when these erroneous statements are corrected, it is very clear that Cupertino et al. does not anticipate Applicant's claim 1.

As an initial matter, Applicant notes that the Office's reliance on Examples 3 and 4 of Cupertino et al. is misplaced. Both of these examples relate to a liquid-liquid extraction, and not to the use of an ion exchange resin. Accordingly, Applicant notes that the Office's assertion that:

[Referring] to the table in the example 4 of US '118, US '118 teaches high selectivity of different metals in the aqueous phase and in the organic phase, which reads on the limitation of removing the metal impurities as recited in the instant claim 1.

Office action dated January 6, 2009 at page 4. This assertion, however, is not particularly relevant, since Example 4 of Cupertino et al. is a liquid-liquid extraction of an aqueous solution of metal ions with a 0.25 molar solution of organic extractant mono-2-(1,3,3-trimethylbutyl)-5,7,7-trimethyloctyl phosphate. It does not disclose the use of a chelating ion exchange resin, as recited in Applicant's claim 1.

With respect to the Office's reliance on Examples 5 and 6 and the disclosure of Cupertino et al. at column 1, lines 11-19 and column 5, lines 5-11, Applicant submits that these disclosures do not anticipate Applicant's claim 1 because they do not disclose every element recited in the claims arranged as recited in the claims, as is required in order for Cupertino et al. to anticipate the claims. See *Net Money/IN Inc. v. VeriSign Inc.*, Fed. Cir., No. 07-1565 (October 20, 2008); *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 220 USPQ 193 (Fed. Cir. 1983); *In re Arkley*, 455 F.2d 586, 172 USPQ 524 (CCPA 1972). These examples are directed to the removal of antimony and bismuth using an ion exchange resin. No copper is disclosed in either example.

As the cases cited above make clear, the Office cannot simply pick and choose from among various different embodiments within a reference and cobble together all of the features recited in Applicant's claims in order to establish anticipation. Yet, this is what the Office has done in order to attempt to establish anticipation.

Because claim 1 is not anticipated, those claims which depend from it are also not anticipated. The Office's anticipation rejection is therefore clearly erroneous as a matter of law, and should be withdrawn.

In addition, the Office's assertions that monovalent copper would inherently form in the process disclosed by Cupertino et al. is unsupported by any facts on this record. Cupertino et al. does not disclose that monovalent copper forms, as the Office has already admitted. Applicant's specification describes processes for producing monovalent copper that require several stages of counter current leaching in order to produce monovalent copper. No such process steps are disclosed in

Cupertino et al. Moreover, even if contact of divalent copper ion with chloride ion in Example 4 of Cupertino et al. would form monovalent copper (which Applicant does not admit), according to the express teachings of Cupertino et al. contact between the chloride stripping solution and the metal ions occurs only after the metal ion has been extracted or absorbed onto a resin.

This is significant because Applicant's claims recite that metal impurities are removed from an aqueous strong chloride solution of monovalent copper by the chelating ion exchange resin. In other words, a feedstock containing chloride ion, monovalent copper (the desired material), and other metals (the undesired impurities) is fed to a chelating ion exchange resin. An effluent stream from the resin containing the chloride ion and the monovalent copper, and depleted in the metal impurities, is obtained. The metal impurities are absorbed by the chelating resin in the presence of chloride ions.

By contrast, Cupertino et al. use a chloride solution as a stripping solution, i.e., they remove the absorbed metals from the resin. Cupertino et al. make this very clear and explicit:

The metal-loaded resin was separated and rinsed thoroughly with distilled water to remove traces of the aqueous feed solution. Seven equal portions, of 1 g each, of the metal-loaded resin were separately contacted with 15 ml portions of aqueous strip solutions containing different concentrations of hydrochloric acid between 0.5 and 6 molar. A further seven portions of the metal-loaded resin were separately contacted with 15 ml portions of aqueous strip solutions containing different concentrations of chloride ion between 1.0 and 7.0 molar. The concentration of hydrochloric acid in each strip solution was 0.5 molar. The chloride ion concentration was varied by adding the required amount of  $\text{CaCl}_2$ . The stripping experiments were carried out at 20°-25° C. with a contact time of 2 hours.

Cupertino et al. at column 7, lines 52-66 (emphasis added). Cupertino et al., in effect, does the opposite of what Applicant has claimed, because Cupertino et al. use chloride ion to desorb divalent metal ions from an ion exchange resin. In Applicant's claimed method, chloride ions are present when metal impurities are absorbed onto the resin.

Applicants respectfully submit that a worker having ordinary skill in this art would not have reasonably have expected to be successful in using a process that requires absorption of metal ions onto an ion exchange resin from a solution containing a material known to result in desorption of metal ions from ion exchange resins. Accordingly, not only does Cupertino et al. completely fail to anticipate Applicants' claim 1, it also does not render that claim obvious to a worker having ordinary skill in this art.

#### OBVIOUSNESS REJECTIONS

A. Claims 2-4 and 13 over Cupertino et al. in view of Partridge

In the Office action dated January 6, 2009, the Office has rejected claims 2-4 and 13 under 35 U.S.C. § 103(a) as obvious over Cupertino et al. in view of U.S. Patent No. 6,165,367 (Partidge). Applicants respectfully traverse this rejection for the reasons given below.

The Office action of June 25, 2008 states:

Regarding claims 2-4, US '118 teaches it is known in the arts that the organic complex is produced from an aqueous solution of metal salt with a chelating agent. This point is further evidenced by US '367. US '367 teaches a method for selectively removing a heavy metal from an aqueous waste [stream] and more particularly to methods for reducing the heavy metal content in the waste [stream] to sub-ppm level (Col. 1, Line 5-9 of US '367). US '367 teaches: ". . . providing a chelating resin containing amino-phosphonic group for capturing the heavy metal ions . . . ."; ". . . wherein the chelating resin is a styrene divinylbenzene copolymer .

... " (Claims 1-4 of US '367); US '367 teaches the resin' group can be "represented as:  $\text{-NH-CH}_2\text{-PO}_3\text{Na}_2$ " (Col. 2, Line 22-37); and US '367 also tests "... a chelating resin with iminodiacetic acid functional group ..." (Col. 4, Line 38-41). Compared with the instant invention, US '367 overlaps the limitations related to chelating ion-exchange resins recited in the instant claims 2-4.

Office action dated June 25, 2008 at page 6 (emphasis added).

First, as explained above, Applicant's claims are not directed to "removing metal ions from an aqueous solution of metal salt with a chelating agent."

Applicant's claims are directed to removing metal impurities from an aqueous strong chloride solution of monovalent copper using an chelating ion exchange resin, while leaving the monovalent copper in the aqueous chloride solution. This is not disclosed or suggested in Cupertino et al. for at least the reasons given above with respect to the Office's erroneous anticipation rejection.

Second, Partridge does not cure the deficiencies of Cupertino et al. noted above. Partridge discloses removing heavy metals, such as uranium, from a waste stream containing complexing anions. However, to the extent that chloride ion is considered such a complexing anion, Partridge only discloses a minor amount (i.e., less than 0.1 M in Example I). Nowhere does Partridge disclose or suggest that a strong chloride solution of monovalent copper could be purified of metal contaminants by passing the solution over a chelating ion exchange resin without absorption of the monovalent copper ion. Even if it were proper to combine Partridge were combined with Cupertino et al. (which Applicant does not admit), the result would not be Applicant's claimed method, but rather a method where all heavy metals are removed (including any monovalent copper) from an aqueous stream containing only minor amounts of chloride ion. This is not the method that Applicant has claimed.

With respect to claim 13, the Office asserts that it would have been obvious to reduce heavy metal content to a sub-ppm level because such a reduction is disclosed by Partridge, and that this somehow makes obvious the feature recited in claim 13 that metal impurities are reduced to a level that corresponds to cathode copper LME-A grade impurity level. What the Office appears to fail to recognize, however, is that the purity level recited in claim 13 is a purity level for copper. In other words, the copper that results from Applicant's claimed process is sufficiently pure that it meets the cathode copper LME-A requirements. This has nothing to do with the reduction of heavy metals in Partridge, however, since Partridge does not disclose any applicability to streams containing copper. Moreover, even if copper were present in a feedstock stream subjected to the process of Partridge, there is nothing in Partridge to suggest that copper would not also be reduced to a sub-ppm level, in which case there would essentially be no copper left in the stream to have its purity evaluated.

For the reasons given above, Applicant respectfully submits that the Office has failed to establish a *prima facie* case of obviousness, and that this rejection should be withdrawn.

B. Claims 10-12 over Cupertino et al. in view of Hyvärinen et al.

In the Office action dated January 6, 2009, the Office has rejected claims 10-12 under 35 U.S.C. § 103(a) as obvious over Cupertino et al. in view of U.S. Patent No. 6,007,600 (Hyvärinen et al.). Applicants respectfully traverse this rejection for the reasons given below.

The Office action dated June 25, 2008 states:

US '118 does not specify the detail process for applying NaCl and alkaline solutions. US '600 teaches: ". . . a countercurrent leaching

of a sulfidic copper material, such as chalcopyritic copper concentrate, in a chloride milieu, so that the obtained product is essentially iron-free alkali chloride-copper chloride solution, where the copper is mainly monovalent . . ." (Col. 2, Line 44-67 and also refer to Fig. 1-3). US '600 shows ". . . the leaching is performed into a circulating NaCl solution . . ." (Col. 3, Line 35-46 and refer to Fig. 1-3). US '600 also teaches: "The precipitation is carried out by means of sodium hydroxide . . ." (Col. 4, Line 3-19, refer to Fig. 1-3 step 13). US '600 teaches the similar hydrometallurgical processes applying on the same copper-contained solution as recited in the instant invention. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to choose suitable NaCl and NaOH treatment in operation as demonstrated in US '600 in the process of US '118 because US '600 teaches the copper by hydrometallurgical chloride processes has the chance to make use of a lower degree of oxidation (Col. 2, Line 33-39 of US '600).

Office action dated June 25, 2008 at page 8 (emphasis added).

Claim 10 relates to the process steps used to elute the absorbed metal impurities from the chelating ion exchange resin used in claim 1, and to regenerate it. The Office has not indicated where Hyvärinen et al. even disclose the use of an ion exchange resin, much less disclose the use of the method recited in claim 10 to elute absorbed impurities and regenerate the resin. Moreover, Applicants respectfully submit that Hyvärinen et al. does not cure the deficiencies of Cupertino et al. noted above.

Claims 11 and 12 relate to the use of hydroxide precipitation to remove the majority of metal impurities from the strong chloride solution of monovalent copper prior to contacting with an ion exchange resin. The precipitation described at column 4, lines 3-19 of Hyvärinen et al. is the precipitation of monovalent copper, not of impurities from the monovalent copper-containing stream. Again, the Office cites a reference that does the opposite of what Applicant is claiming, and relies on such a reference to allege that Applicant's claims are unpatentable. Even if it were proper to



combine Hyvärinen et al. (which Applicant does not admit), the result would not be Applicant's invention because there is no disclosure of any monovalent copper in Cupertino to be precipitated out. Even if there were such a disclosure, there is no suggestion in either reference to precipitate out the monovalent copper before treatment with an ion exchange resin. For at least this reason, Applicant respectfully submits that the Office has failed to establish a *prima facie* case of obviousness, and that this rejection should be withdrawn.

#### CONCLUSION

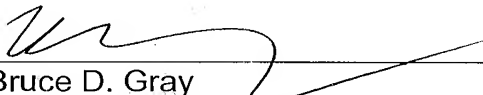
Applicants submit that this application is in condition for immediate allowance, and an early notification to that effect is respectfully requested. If the Examiner has any questions about this application, or believes that any issues remain to be resolved, the Examiner is respectfully requested to contact the undersigned to arrange for a personal or telephonic interview to resolve these issues prior to the issuance of another Office action.

Respectfully submitted,

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